

WHAT IS CLAIMED IS:

1. An electro-optical device comprising:

a pair of substrates;

an electro-optical modulating layer provided between said substrates;

matrix lines comprising column control lines and row control lines provided on one of said substrates;

a plurality of pixel electrodes provided on said one of said substrates;

a plurality of transistors provided on said one of said substrates, each of the transistors being connected to corresponding one of said pixel electrodes at one of source and drain terminals thereof, to corresponding one of said row control lines at the other one of the source and drain terminals, and to corresponding one of said column control lines at a gate terminal thereof;

means for supplying a signal to each of said transistors at two signal levels of a reference voltage level and an intermediate level;

means for addressing said transistors once per an addressing period;

means for controlling a ratio (a total period of the reference voltage level during the addressing period)/(a total period of the intermediate level during the addressing period); and

means for supplying said reference voltage level at high and low two levels with said intermediate level between said high and low two levels, and with said high and low two levels alternated.

2. The device of claim 1 wherein said addressing means can address the row control lines rotationally.

3. The device of claim 1 further comprising:

a first clock for producing a first period; and

a second clock for producing a second period,

wherein one duration of the reference voltage level can be a natural-number times of said first period and one duration of the intermediate level can be a natural-number times of said first period and said addressing period can be two or more natural-number times of said first period and said high and low two levels can be alternated at said second period.

4. The device of claim 1 wherein said electro-optical modulating layer comprises a liquid crystal selected from the group consisting of a ferroelectric liquid crystal, an anti-ferroelectric liquid crystal, a nematic liquid crystal and a cholesteric liquid crystal.

5. The device of claim 1 wherein said electro-optical modulating layer comprises an organic resin and a liquid crystal dispersed in said organic resin, said liquid crystal being selected from the group consisting of a nematic liquid crystal, a cholesteric liquid crystal and a smectic liquid crystal.

6. The device of claim 3 wherein said second period is longer than said first period.

7. The device of claim 3 further comprising means for synchronizing the production of said second period with the

production of the first period with said second period being two or more natural-number times of said first period.

8. The device of claim 1 wherein an offset voltage can be applied to an electrode provided on the other one of said substrates.

9. An electro-optical device comprising:

a pair of substrates;

an electro-optical modulating layer provided between said substrates;

matrix lines comprising column control lines and row control lines provided on one of said substrates;

a plurality of pixel electrodes provided on said one of said substrates;

p-channel and n-channel transistor pairs provided on said one of said substrates, each pair of the p-channel and n-channel transistors being connected to corresponding one of said pixel electrodes at one of source and drain terminals of the p-channel transistor of said each pair and at one of source and drain terminals of the n-channel transistor of said each pair, to one of corresponding pair of the row control lines at the other one of the source and drain terminals of the p-channel transistor, to the other one of said corresponding pair of the row control lines at the other one of the source and drain terminals of the n-channel transistor, and to corresponding one of said column control lines at gate terminals of the p-channel and n-channel transistors of said each pair;

means for supplying a signal to each of said p-channel and n-channel transistor pairs at two signal levels of a

reference voltage level and an intermediate level;

means for addressing said p-channel and n-channel transistor pairs once per an addressing period;

means for controlling a ratio (a total period of the reference voltage level during the addressing period)/(a total period of the intermediate level during the addressing period);
and

means for supplying said reference voltage level at high and low two levels with said intermediate level between said high and low two levels, and with said high and low two levels alternated.

10. The device of claim 9 wherein said addressing means can address the row control lines rotationally.

11. The device of claim 9 further comprising:

a first clock for producing a first period; and

a second clock for producing a second period,

wherein one duration of the reference voltage level can be a natural-number times of said first period and one duration of the intermediate level can be a natural-number times of said first period and said addressing period can be two or more natural-number times of said first period and said high and low two levels can be alternated at said second period.

12. The device of claim 9 wherein said electro-optical modulating layer comprises a liquid crystal selected from the group consisting of a ferroelectric liquid crystal, an anti-ferroelectric liquid crystal, a nematic liquid crystal and a cholesteric liquid crystal.

13. The device of claim 9 wherein said electro-optical modulating layer comprises an organic resin and a liquid crystal dispersed in said organic resin, said liquid crystal being selected from the group consisting of a nematic liquid crystal, a cholesteric liquid crystal and a smectic liquid crystal.

14. The device of claim 9 further comprising red, green and blue color filter films provided on the other one of said substrates.

15. The device of claim 11 wherein said second period is longer than said first period.

16. The device of claim 11 further comprising means for synchronizing the production of said second period with the production of the first period with said second period being two or more natural-number times of said first period.

17. The device of claim 9 wherein an offset voltage can be applied to an electrode provided on the other one of said substrates.

18. An electro-optical device comprising:

a pair of substrates;

an electro-optical modulating layer provided between said substrates;

a plurality of pixels arranged between said substrates in the form of matrix;

means for addressing said pixels once per an addressing period;

means for supplying digital data to said pixels by the use of two signal levels of a reference voltage level and an intermediate level;

means for controlling a ratio (a total period of the reference voltage level during the addressing period)/(a total period of the intermediate level during the addressing period); and

means for supplying said reference voltage level at high and low two levels with said intermediate level between said high and low two levels, and with said high and low two levels alternated.

19. The device of claim 18 wherein said electro-optical modulating layer comprises a liquid crystal selected from the group consisting of a ferroelectric liquid crystal, an anti-ferroelectric liquid crystal, a nematic liquid crystal and a cholesteric liquid crystal.

20. The device of claim 18 wherein said electro-optical modulating layer comprises an organic resin and a liquid crystal dispersed in said organic resin, said liquid crystal being selected from the group consisting of a nematic liquid crystal, a cholesteric liquid crystal and a smectic liquid crystal.

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